

Claim Amendment

Claim 1 (original) A distance measurement method using ultrasonic, comprising the steps of:

transmitting an ultrasonic pulse having specific frequencies to each object;
receiving the ultrasonic pulse that is reflected from the object or directly transmitted; and
extracting a specific frequency of the received ultrasonic wave pulse to find an arrival time of a first pulse and converting the time into a distance.

Claim 2 (original) The distance measurement method as claimed in claim 1, wherein the step of finding the arrival time and converting the time into the distance further includes the step of separating a specific frequency of the ultrasonic and converting an arrival time of an ultrasonic that is received for the first time among the separated ultrasonic into the distance, in a state where the waveform is mixed with noise having different frequency properties from the specific frequency of the transmitted ultrasonic.

Claim 3 (currently amended) The distance measurement method as claimed in claim 1 or 2, wherein in the step of converting the time into the distance, the extraction of the specific frequency from the received ultrasonic further comprises the steps of:

amplifying the received ultrasonic to generate an amplified signal;
weakening a signal of an unnecessary frequency among the amplified signal through an analog filter circuit to generate a filtered signal;
amplifying the filtered signal again to generate a re-amplified signal; converting the re-amplified signal into a digital signal; and
extracting a specific frequency from the converted digital signal through a digital signal processing.

Claim 4 (original) The distance measurement method as claimed in claim 3, further comprising the step of specifying a distance range to be excluded when measuring a distance of the object, such that a distance exceeding the specified distance range is measured.

Claim 5 (original) The distance measurement method as claimed in claim 1, wherein the step of receiving the ultrasonic reflected from the object while the object is moving comprises changing a received frequency depending on variation of the frequency of the transmitted ultrasonic.

Claim 6 (original) A distance measurement method using ultrasonic, comprising the steps of:

- installing a first receiver for receiving an ultrasonic at a known position;
- installing a second receiver for receiving an ultrasonic at an object to be measured;
- transmitting an ultrasonic having a specific frequency from a location where a distance from the object will be measured, to the first and second receivers;
- extracting specific frequencies of the ultrasonic received from the first and second receivers to find an arrival time of a first signal and converting the time into a distance;
- transmitting error information related to a difference between the distance received by the first receiver and the known distance to the second receiver; and
- allowing the second receiver to correct the velocity of sound using the error information.

Claim 7 (original) A distance measurement device using ultrasonic, comprising:

- a transmitter for generating an ultrasonic having a specific frequency;
- a sensor for detecting the ultrasonic reflected from an object;
- an amplifier for amplifying the ultrasonic detected by the sensor;
- an analog filter for selectively attenuating other frequencies except for a specific frequency from the ultrasonic amplified by the amplifier;

a secondary amplifier for amplifying an analog signal selected through the analog filter;

an A/D converter for converting the amplified analog signal to a digital data; a memory for storing the digital data therein;

a digital signal processor for processing the digital data stored in the memory; an output unit for displaying results processed in the digital signal processor;

a numerical input unit for informing the digital signal processor of a processing condition; and

a communication unit for connecting the digital signal processor and an external apparatus to each other so that the digital signal processor and the external apparatus can exchange information,

wherein a transmission time of a first signal among the received ultrasonic and a delayed time of an arrival time of the first signal calculated in the digital signal processor are measured.